of his life—and it is difficult to ascertain whether it was a consequence of his rejection of space as an independent entity.[77] The unemphatic shift of Leibniz's physics towards a relational conception of motion, however, had no consequences for Leibniz's notion of space. In particular, there are no texts from the period in which space is said to be relational in consequence of the relationality of motion.

Leibniz summarized the development of his philosophy of space, matter, and motion in a text written on his departure from Paris, or perhaps right after his arrival in Hanover in 1677. This is the important fragment, mentioned in §1, in which some interpreters claim to find a relational theory of space, but in which there is none. In it, Leibniz stated that motion is relational, and space does not exist:

> If space is a certain thing consisting in a supposed pure extension, whilst the nature of matter is to fill space, and motion is change of space, then motion will be something absolute; and so when two bodies are approaching one another, it will be possible to tell which of them is in motion and which at rest; or, if both are moving, with what speed they are moving. And from this will follow those conclusions which I once showed in the *Theoria motus abstracti*. But in fact such a space is not a thing; and motion is not something absolute, but consists in relation [*Sed revera Spatium illud res non est, neque motus est aliquid absolutum, sed consistit in relatione*].[78]

The highly peculiar trajectory of Leibniz's natural philosophy in the early 1670s pushed him away from the Neoplatonic radicalism of his youth and marked a point of no return for his philosophy of space. This momentous transformation was caused by an episode in the evolution of Leibniz's metaphysical ideas on matter and impenetrability. Even if Leibniz changed his mind on the nature of matter again in the following years, he never stepped back from the view that space 'is not a thing'—and much less a substance.

[77] Later, Leibniz claimed that the relationality of motion is indeed a consequence of the unreality of space, but this point was not explicit in the earliest fragments on relational motion. It may be noted that given Leibniz's system of natural philosophy, the relationality of motion entailed the relationality of matter itself, since matter had been defined as motion. Leibniz explicitly drew the consequence and stated that matter *non nisi in relatione existit* (A VI, 3, N. 36_1, 392). Note that in this period it seems more natural for Leibniz to move from the relationality of motion, place, *situs*, and time to the relationality of matter than to the relationality of space.

[78] *Spatium et motus revera relationes*, in A VI, 4, N. 359, 1968; trans. in Arthur, *Labyrinth*, 225, slightly modified. The *Theoria motus abstracti* is a section of the *Hypothesis physica nova* of 1671.

Материал, защищенный авторским правом

A detailed analysis of the development of Leibniz's thought on space shows the limits of any rational reconstruction starting from the Leibniz–Clarke correspondence. Leibniz's final dismissal of a substantivalist theory of space had nothing to do with theology, the Principles of Reason or Indiscernibles, the relativity of motion, or the other topics discussed later in the famous exchange. It had nothing to do with conceiving of space as a system of relations. In 1672, Leibniz did not replace the substantivalist theory of space with a relational one, and in his middle period he upheld a non-substantivalist and yet non-relational metaphysics of space.

3. Leibniz's Theory of Space in the Middle Period (1672–88)

In the sixteen years separating Leibniz's rejection of substantial space (1672) and his reading of Newton's *Principia* (1688), the theory of space was no longer at the forefront of Leibniz's interests. These years are characterized by the tumultuous development of Leibniz's most famous philosophical doctrines. In 1676, the issue of the unity of bodies acquired importance (since bodies were now regarded as infinitely divided into smaller and smaller moving—and thus impenetrable—parts of matter), and Leibniz began to think that a unity is conferred on bodies by minds. In 1676–7, as we have seen, he accepted the relationality of motion. Around 1678, Leibniz first introduced forces in order to explain resistance to motion (inertial mass), the action of bodies, and the distinction between apparent and true motions.[79] In 1679, he famously reinstated Aristotelian substantial forms in metaphysics, with the aim of grounding both physical forces and the powers of the mind. From these ingredients (and several others), Leibniz worked out in the 1680s a rich metaphysical system dominated by corporeal substances, which was first presented in the *Discours de métaphysique* (1686) and the ensuing correspondence with Arnauld.[80]

In all these texts, space is seldom mentioned. From Leibniz's terse remarks on the topic, it is clear that he was not elaborating a theory of space—much less an original theory—but adapting well-known Scholastic doctrines to his own changing metaphysics. Matters of detail concerning space may have changed over the years. Nonetheless, details apart, it is remarkable that a

[79] See above, note 9.

[80] For an insightful account on the development of Leibniz's views in this period, see Garber, *Leibniz*.

Материал, защищенный авторским правом

fairly consistent picture of space emerged in the late 1670s and 1680s and was left mostly unscathed through all the transformations of Leibniz's philosophy in the middle period.

According to this picture, space is nothing but *the extension of the world*, considered in abstraction from every other property of bodies:

> For, once we have removed every such thing from a body, we are left imagining something like a darkness, that we call space.[81]

In the 1680s, Leibniz's most common definitions of space revolve around it being an *extensum purum* (or *nudum*) *absolutum* (or *universum*, *perfectum*): an extension, which is *pure*, i.e. without other determinations and taken in abstraction from substantial forms, forces, motion, secondary qualities, etc., and *absolute*, i.e. not limited to particular regions but considered in its totality (in opposition to geometrical figures, which are parts and sections of space).[82]

So conceived, space is not an independent substance or a container of substances. Leibniz's physical world is now composed of an infinity of nested corporeal substances, which move with respect to one another, resist penetration by forces, and do not need to be conceived of as embedded in any extended container.[83] Space is the aggregate of the individual extensions of all these substances. Any vacuum continued to be banned from Leibniz's natural philosophy (despite occasional afterthoughts), and Leibniz still claimed that space might only be real if a vacuum existed.[84] In some texts, he

[81] *Demonstratio axiomatum Euclidis* (1679), in A VI, 4, N. 54, 177. Note that, according to Leibniz, space is continuous and bodies are not: this seems to be a consequence of mentally subtracting boundaries (together with substantial forms, forces, and other properties) from the corporeal world.

[82] A definition of space as *extensum purum absolutum* is offered in §9 of the *Characteristica geometrica* from 1679, which is the most important text on *analysis situs* of the period: see GM V, 144; also in J. Echeverría and M. Parmentier (eds.), *Leibniz. La caractéristique géométrique* [*Caractéristique*] (Paris: Vrin, 1995), 150. In the same essay, space is even regarded as a phenomenon (see below, note 97). See also A VI, 4, N. 54, 79 ('. . . extensum in quo nihil aliud quam extensio considerari potest'); A VI, 4, N. 144, 605–6 (*spatium universum*); A VI, 4, N. 148, 633 (*extensum nudum*); Echeverría and Parmentier, *Caractéristique*, 82 and 94 (*extensum purum perfectum*); A VI, 4, N. 156, 668 ('spatium mundanum est quod extensum est, et in quo est omne quod in extenso est'); A VI, 4, N. 267, 1393 ('extensum, absolute, sine alio addito'); LH XXXV, 1, 5, Bl. 49 ('Spatium ipsum absolutum, in quo per se nihil aliud considerari potest quam extensio').

[83] The only text that I know of in which space is still called a '*receptaculum*' is a paragraph of the *De mundo praesenti* of 1684–6 (A VI, 4, N. 301, 1509).

[84] Leibniz never retreated from the denial of a vacuum in 1672. In 1678–9, he restated the idea that there is no difference between a perfectly fluid body (a body with no resistance) and a vacuum, and inferred the non-existence of the latter from the non-existence of the former

Материал, защищенный авторским правом

added that nothing would change if one accepted the real existence of space and a vacuum, and therefore they should be rejected from metaphysics—a Leibnizian razor of sorts.[85] In these years Leibniz does not seem to have considered substantial space to be impossible—as he did in later years—but something that only happens not to exist.[86]

Space is therefore a mind-dependent thing, since pure extension does not exist *per se* but only as the product of an act of abstraction from other features of the physical world. Yet space has a certain degree of reality, since it is grounded on the extension of bodies. Leibniz also continued to refer to God's immensity as the source of the reality of space.[87]

This conception of space has a further implication. Space is not a merely *possible* thing, as it would be in the Leibniz–Clarke correspondence. Rather, it is an actual (even if semi-mental) being, since it is the extension of the actual world. In April 1676, when Leibniz had not yet developed his theory of possible worlds and was toying with Spinoza's philosophy, he temporarily envisaged the existence of a plurality of isolated, non-communicating worlds. In these texts, Leibniz explicitly stated that each of these worlds

(*Conspectus libelli*, in A VI, 4, N. 365, 1988; the same text discusses the infinity of space). Nonetheless, in his 1683 notes on Weigel's *Universum Corpus Pansophicum* (Jena: Bauhofer, 1672), Leibniz suspended judgment on the existence of a vacuum (A VI, 4, N. 237$_4$, 1182). On the difficulty of proving the non-existence of a vacuum, see also Leibniz's correspondence with Malebranche from 1676, in A II, 1, NN. 123–5, 398–406. The statement that if a vacuum were real, space would be a substance can still be found in Leibniz's 1691 marginalia on Spinoza's *Principia philosophiae*: 'Sed ipsum Spatium vacuum si datur, erit substantia' (these marginal notes are still unpublished in *Leibn. Marg.* 31 but forthcoming in volume VI, 5 of the Academy edition).

[85] This is stated in a short note from 1678–80: 'Videtur demonstrari posse nullam esse substantiam quam vacuum, materiam aut spatium. Quia nihil distinctum apparet sive ponamus ea esse sive non esse. Omnia redibunt eodem' (A VI, 4, N. 339, 1783). The argument has connections with Leibniz's 'Herculean Argument' to the effect that all those things of which no one can perceive whether they are or not, are not (A VI, 4, N. 316, 1637).

[86] The introduction of forces transformed Leibniz's conception of matter and, as a consequence, also had a subtle effect on the ontology of space. Leibniz abandoned the idea that the impenetrability of bodies is grounded in motion and, rather, claimed that it has its foundation in forces. Matter ceased to be a moving extension and became an extension endowed with a resisting force. This was a restoration of Leibniz's early notion of ἀντιτυπία as an essential attribute of matter, which he had taken from the atomist and Neoplatonic traditions. Yet, from the 1680s the resistance of matter to penetration was no longer a primitive ingredient of Leibniz's new metaphysics but, rather, a dynamic consequence of the power of substances. See, for instance, A VI, 4, N. 267, 1393–4; A VI, 4, N. 279, 1465; A VI, 4, N. 420, 2419, and 2422.

[87] See, for instance, the *Definitiones notionum metaphysicarum* from the mid-1680s, stating that 'Quicquid ergo reale est in spatio et tempore, id est in Deo omnia complectente' (A VI, 4, N. 147, 629). The topic is also discussed in Leibniz's reading notes on Malebranche from the same period (A VI, 4, N. 447, 2651) and in the later *De abstracto et concreto* of 1688 (A VI, 4, N. 208, 990).

Материал, защищенный авторским правом

would have *its own* space.[88] A few months later, he abandoned this view and claimed that there is one space, since there is one (existing) world. The idea that space is an ideal order of possibilities—independent of any world—had not yet crossed his mind.

In some texts from around 1684 discussing the notion of abstraction, Leibniz offered further details of his ontology of space. Leibniz distinguished between complete and incomplete beings and then again between concrete and abstract beings, taking these two oppositions as orthogonal to one another. He then said that substances are complete and concrete (the only 'real' things in the world) and that essences and accidents are (respectively, complete and incomplete) abstract entities. Finally, Leibniz regarded 'mathematical beings', such as *space*, as *concrete and incomplete* things.[89]

Such a characterization of space as an incomplete concrete thing is at odds with Leibniz's later conception of space as an *abstract* order of situations. As a matter of fact, already in the 1680s all relations and the notions of *order* and *situation* are catalogued by Leibniz among the abstract entities, rather than the concrete ones. But space has nothing to do with them. In the middle period, Leibniz always connects space—as the concrete extension of this world—not with abstract thought, but with imagination and with sensible and confused perception.[90]

[88] See the *De veritatibus, de mente, deo, de universo* of April 1676, in A VI, 3, N. 71, 511–12. Leibniz added that God's immensity would be the same in all these separate spaces. See also the important *De formis simplicibus* of the same month, in which Leibniz seems to envisage spaces with different geometrical properties (A VI, 3, N. 75, 522). On this text, see J.-P. Anfray, 'Leibniz and Spinoza on Plenitude and Necessity', in Y. Melamed (ed.), *A Companion to Spinoza* (London: Wiley-Blackwell, 2021), 495–505.

[89] See *De notionibus*: '*Substantia* est concretum completum, ut Homo aliquis verbi gratia, Caesar. *Accidens* est abstractum incompletum. Abstractum completum est ipsa Essentia Substantiae, verbi gratia Lentuleitas; concretum incompletum est Ens aliquod Mathematicum quod instar substantiae concipimus, ut Spatium, Tempus' (A VI, 4, N. 98_3, 400). Cf. also the *Divisio terminorum*, in A VI, 4, N. 132, 558–60. Leibniz's distinction between abstract and concrete terms comes explicitly from Hobbes (who has the example of the 'Lentuleitas': *De corpore* I, 3, §3, taken from Cicero). The characterization of τὰ μαθηματικά as objects produced by abstraction through separation (ἀφαίρεσις) is also Hobbes's, but originally Aristotelian: see, for instance. *An. post.* A 18, 81^b3 or *De an.* Γ 4, 429^b18 and Γ 7, 431^b12. In the *Divisio terminorum*, in A VI, 4, N. 132, 565, Leibniz employs the verb *abstrahere* to denote this procedure, but it is an 'abstraction *from*' things in space ('abstrahendo animum ab his quae sunt in ipso') in order to obtain something, pure space, which is not itself abstract but, rather, concrete.

[90] On the relation between extension and perception, see, for instance, the *Demonstratio axiomatum Euclidis* (1679), in A VI, 4, N. 54, 176–7; *Enumeratio terminorum simpliciorum* (around 1684), in A VI, 4, N. 97, 393; *Divisio terminorum* (around 1685), in A VI, 4, N. 132, 565; *De calculi geometricis elementis* (1685), in A VI, 4, N. 144, 604. For an early stance on perception and space, see also *De veritatibus* (1676), in A VI, 3, N. 71, 511.

Материал, защищенный авторским правом

Moreover, the process of mental subtraction of the features of the world in order to obtain concrete space as pure extension seems to be a disposition present in any thinking being. Indeed, Leibniz's earliest statement that the *idea of space* is *innate* seems to date from around these years.[91]

Leibniz claimed that space, insofar as it is a concrete and incomplete being, may be conceived of *as if it was a substance*. This is first stated in 1684:

> A concrete and incomplete being is a mathematical being, which we conceive of as if it was a substance (*instar substantiae*), such as space and time.[92]

It is reasserted sometime later, possibly in 1685:

> Similarly, mathematical objects, such as space, time, a sphere, an hour, are just phenomena, which we consider as if they were substances.[93]

Here Leibniz seems to have found a term to characterize these concrete and incomplete beings: they are *phenomena*.[94]

The notion of a phenomenon is highly polysemic in Leibniz's philosophy, and it escapes a unitary definition.[95] Nonetheless, many of the features that Leibniz usually associated with phenomena are appropriate to his conception of space in the 1680s. A phenomenon is a concrete being (as opposed to abstract concepts, relations, and orders), which is not a substance and is partly mind-dependent. Often, a phenomenon is not just an arbitrary fiction but is *bene fundatum* in something real and substantial: and this is the case with space, which is grounded in God's immensity. A phenomenon is sometimes characterized as an *ens per aggregationem*, just as Leibniz conceived of space in some of the above-mentioned texts.[96]

[91] It is found in Leibniz's reading notes on Weigel's *Corpus Pansophicum*, dating from 1683 (A VI, 4, N. 237$_4$, 1172). Leibniz's statement, however, echoes Weigel's own claim on innatism (*Corpus Pansophicum*, 43), and it is therefore not clear whether Leibniz consistently endorsed a theory of spatial innatism before his more explicit reactions to Locke's *Essay*, written in the period in which Leibniz had already formulated the relational theory of space.

[92] See above, note 89. The 'instar substantiae' doctrine is also Aristotelian (see note 49).

[93] *Divisio terminorum*, in A VI, 4, N. 132, 559–60.

[94] At the beginning of his elaboration of the notion of space in the middle period, Leibniz had already suggested that space might be a phenomenon. In the *Characteristica geometrica* of 1679, he stated that 'it is not relevant in this connection whether this space is really distinct from matter, or rather a constant appearance or phenomenon' (GM V, 144; also in Echeverría and Parmentier, *Caractéristique*, 150–2). See also the *Definitiones cogitationesque metaphysicae*, in A VI, 4, N. 267, 1396–7.

[95] For an excellent presentation of this point, see Garber, *Leibniz*, 267–302, as well as G. A. Hartz, 'Leibniz's Phenomenalisms', *The Philosophical Review*, 101 (1992), 511–49.

[96] A VI, 3, N. 36$_1$, 391; A VI, 3, N. 74, 519 and 521.

Материал, защищенный авторским правом

In October 1687, Leibniz advanced the idea that space is a phenomenon in his important correspondence with Arnauld:

> matter considered as the mass in itself is only a pure phenomenon or a well-founded appearance, as also are space and time.[97]

This passage has been much discussed in the literature. Some Leibniz scholars—assuming that Leibniz held the same theory of space throughout his life—wrongly concluded that space as an order of situations is a phenomenon.[98] Others denied that an order of situations can ever be a phenomenon and took this passage to be a slip of the pen (Leibniz meant that space is an abstract, ideal entity, but he wrongly wrote, twice, 'phenomenon'); or argued that here 'phenomenon' has such a vague meaning as to also encompass abstract orders and relations; or yet that, in this case, 'phenomenon' merely means that we tend to mistake space for a substance.[99] From the present developmental approach to Leibniz's theory of space, it becomes clear that Leibniz's claim to Arnauld is in keeping with his general views on space in the 1680s.

[97] Leibniz to Arnauld, 9 October 1687, in A II, 2, N. 57, 249; trans. in H. T. Mason (ed.), *The Leibniz–Arnauld Correspondence* (Manchester: Manchester University Press, 1967), 152. The passage has a draft written by Leibniz in September: '. . . elle n'entre pas dans la substance et n'est qu'un pur phenomene; à peu prés comme l'espace, le temps, et le movement' (A II, 2, N. 56, 234).

[98] Current scholarship generally acknowledges a 'three-level' ontology in Leibniz's late thinking, constituted by substances, phenomena, and ideal entities such as space and time. While this rough model can surely be refined, the main point of its first proponents was precisely to show, against previous interpreters, that space as a system of relations was not regarded by Leibniz as a phenomenon. This claim was first defended in J. E. McGuire, '"Labyrinthus Continui": Leibniz on Substance, Activity, and Matter', in P. K. Machamer and R. G. Turnbull (eds.), *Motion and Time, Space and Matter* (Columbus: Ohio State University Press, 1976), 290–326; then A. T. Winterbourne, 'On the Metaphysics of Leibnizian Space and Time', *Studies in the History and Philosophy of Science*, 13 (1982), 201–14; and later brought to general acceptance by Cover and Hartz, 'Space'. It opposed some earlier views (advanced by Nicholas Rescher, Ian Hacking, John Earman, and others) conceiving relational space as a phenomenon.

[99] In particular, Crockett, 'Space', and Arthur, *Leibniz*, champion the idea that Leibniz's theory of space as an order of relations was already in place at the time of the correspondence with Arnauld, and therefore the reference to 'phenomena' here does not point to a different theory. Crockett's essay suffers from some textual difficulties: he does not mention Leibniz's *Divisio terminorum* (see above, note 93), misdates several other passages relying on Arthur's dating, and employs Loemker's incorrect text of the *Primae veritates* (see below, note 123). Arthur claims that Leibniz did not endorse a proper 'theory' of space as a phenomenon (Arthur, *Leibniz*, 214), and that the latter expression only means that space is 'pictured in the imagination' and 'mistaken as representing a substance' (215). Elsewhere, he also claims that when Leibniz calls space and time 'phenomena', he may be just meaning the actual phenomena (i.e. bodies) occupying portions of (relational) space and time (71 and 219). The main point, however, is that neither Crockett nor Arthur realizes that the definition of space as a relation only appeared a year later, in 1688.

Материал, защищенный авторским правом